

Dear Sir:

**A) Introductory Comments**

In the Office Action mailed 8/20/2004, the Examiner declares claims 1-23 subject to restriction and/or election requirement.

**B) Summary of Examiner's Restriction Requirement**

Restriction to one of the following inventions is required:

- I. Claims 1-11, drawn to a method to detect fluid pressure, classified in class 073, subclass 152.27.
- II. Claims 12-23, drawn to a tool to detect fluid pressure, classified in class 073, subclass 152.27.

Should the applicant elect group I then further restriction is required:

- IA. Claims 2-6, drawn to a method to detect fluid pressure using an abrupt change detection, classified in class 073, subclass 152.27.
- IB. Claims 7 and 8, drawn to a method to detect fluid pressure by comparing to a reference value, classified in class 073, subclass 152.27.
- IC. Claims 9-11, drawn to a method to detect fluid pressure by expanding a volume of a cavity, classified in class 073, subclass 152.27.

Claim 1 is a linking claim and will be examined with the election of either group IA, IB, or IC.

Should the applicant elect group II then further restriction is required as noted below.

IIA. Claims 13-15 and 23, drawn to a tool with control means, classified in class 073, subclass 152.27.

IIB. Claims 16-19, drawn to a tool with a constant volume flow line, classified in class 073, subclass 152.27.

IIC. Claims 20-22, drawn to a tool with an isolation valve and probe, classified in class 073, subclass 152.27.

Claim 12 is a linking claim and will be examined with the election of either group IIA, IIB, or IIC.

#### **C) Applicant's Election**

Applicants elect Group IA with traverse.

Applicants believe that method claim 1, currently amended by Preliminary Amendment, should be examined with the Group IA in the present application.

Applicants believe that apparatus claim 12, currently amended by Preliminary Amendment, should also be examined with the Group IA in the present application in accordance with MPEP § 806.05(e), because it now includes means for practicing the process.

#### **D) Preliminary Amendment**

Responsive to the restriction requirement, applicants respectfully request that claims 1-8 and 12 be amended by preliminary amendment, as indicated below. No new matter is added.

1. (currently amended) A method for determining formation fluid pressure in earth formation surrounding a borehole, the borehole defining a borehole wall, the borehole wall covered with mud cake forming a mud cake seal, the method comprising:
  - providing a tool defining a probe and a variable-volume pretest cavity fluid-coupled to the probe;
  - pressing a the probe into contact with the mud cake and formation at the borehole wall;
  - expanding the volume of ~~a variable-volume pretest~~ the cavity that is in fluid communication with the probe in sufficient amount to produce a break in the mud cake seal during a draw-down period ~~to break a mud cake seal at the probe;~~
  - ~~terminating expanding the volume of the cavity on~~ holding constant the volume of the cavity immediately after detecting the occurrence of a the break in the mud cake seal, for a sufficient build-up period to establish pressure equilibrium between cavity fluid and formation fluid;
  - ~~allowing a build-up period to establish pressure equilibrium between tool fluid and formation fluid;~~
  - measuring tool-pressure in the cavity; and
  - setting formation fluid pressure equal to tool measured pressure at ~~pressure~~ equilibrium.
2. (currently amended) A method according to claim 1, wherein detecting the a break in the mud cake seal includes measuring tool cavity pressure and detecting an abrupt change associated with tool cavity pressure.
3. (currently amended) A method according to claim 2, wherein detecting the abrupt change includes using a finite moving average (FMA) algorithm on a function of tool cavity pressure.

4. (currently amended) A method according to claim 3, wherein the function of ~~tool~~ cavity pressure includes ~~tool~~ cavity pressure.
5. (currently amended) A method according to claim 3, wherein the function of ~~tool~~ cavity pressure includes a first derivative of ~~tool~~ cavity pressure.
6. (currently amended) A method according to claim 3, wherein the function of tool pressure includes a second derivative of ~~tool~~ cavity pressure.
7. (currently amended) A method according to claim 1, wherein detecting the a break in the mud cake seal includes detecting a difference between a measured ~~tool~~ cavity pressure and a corresponding ~~tool~~ cavity pressure from a reference ~~tool~~ cavity pressure profile.
8. (currently amended) A method according to claim 7, wherein the reference ~~tool~~ cavity pressure profile is measured in a previous drawdown with the cavity isolated from the formation.
9. (original) A method according to claim 1, further comprising:  
expanding the volume of the cavity during the draw-down period at a  
predetermined constant rate.
10. (original) A method according to claim 9, wherein the predetermined constant rate is within the range of 3-160cc/minute.
11. (original) A method according to claim 10, wherein the predetermined constant rate is approximately 5cc/minute.

12. (currently amended) A tool for determining formation fluid pressure in earth formation surrounding a borehole, the borehole defining a borehole wall, the borehole wall covered with mud cake forming a mud cake seal, the tool comprising:
- an elongated body adapted for downhole operation;
  - a probe, extendable from the elongated body, the probe defining an inflow aperture;
  - a pretest piston pump defining a variable-volume pretest cavity coupled to the inflow aperture;
    - a) means for expanding the volume of the pretest cavity in sufficient amount to produce a break in the mud cake seal.
    - b) means for detecting an occurrence of a break in the mud cake seal. and
    - c) means for holding constant the volume of the cavity immediately after detecting the occurrence of the break in the mud cake seal, for a sufficient build-up period to establish pressure equilibrium between pretest cavity fluid and formation fluid;
  - and
  - a pressure sensor coupled to measure pressure in the pretest cavity.
  - a pretest flow line coupling the inflow aperture to the cavity;
  - control means including
  - pressure measuring means, pressure coupled to the cavity for measuring tool pressure; and
  - electromechanical control means for controlling the volume of the cavity.
13. (original) A tool according to claim 12, wherein the control means includes an electromechanically driven roller screw planetary system.
14. (original) A tool according to claim 13, wherein the control means further includes an electrically driven gearbox coupled to drive the roller screw planetary system.

15. (original) A tool according to claim 12, wherein the control means includes downhole programmable control electronics coupled to control the electromechanical control means.
16. (original) A tool according to claim 12, wherein the tool includes a constant-volume flow line.
17. (original) A tool according to claim 16, wherein the constant-volume flow line includes a dedicated probe.
18. (original) A tool according to claim 16, wherein the constant-volume flow line includes a flexible conduit.
19. (original) A tool according to claim 16, wherein the constant-volume flow line has a volume in the range 20 - 120cc.
20. (original) A tool according to claim 12, wherein the probe is located between the pressure measuring means and the variable-volume pretest cavity.
21. (original) A tool according to claim 12, further comprising a sample line coupled to the cavity, and an isolation valve located between the cavity and the sample line.
22. (original) A tool according to claim 12, further comprising an isolation valve located between the cavity and the formation fluid inflow aperture.

**E) Applicant's Reply to Restriction between Groups I and II**

Applicants believe that restriction to one of Groups I and II is not justified by the Examiner's statement "In the instant case the method does not require all of the elements of the apparatus, such as, among other items, an electrically-driven roller screw planetary system and a dedicated probe". The restriction is not justified for each of the following reasons.

- 1) All of the claims of groups I and II are classified as belonging to this same class and subclass, and therefore do not require excessive search.
- 2) The Examiner fails to provide an example as required by MPEP § 806.05(h). The Examiner's statement does not address the test for restriction under MPEP § 806.05(h)). The test is "the product as claimed can be used in a materially different process", and "the burden is on the Examiner to provide an example" (MPEP § 806.05(h)). Therefore, the Examiner's prima facie argument for restriction of claims 1 and 12 is incomplete because the Examiner failed to provide an example.
- 3) In respect to restriction of claim 12 from the claims of groups I and IA, the tool of claim 12 does not include either "an electrically-driven roller screw planetary system" or a "dedicated probe". (The tool of claim 12 does include a probe but does not require that the probe be dedicated). Therefore, the Examiner's argument for restriction of claim 12 from Groups I and IA is invalid.
- 4) As noted above, apparatus claim 12, currently amended by Preliminary Amendment, now includes means for practicing

the process and should therefore be examined with Group IA in accordance with MPEP § 806.05(e).

**F) Applicant's Reply to Restriction between Groups IA and IB**

Applicants note that all of claims 1-23 are classified as belonging to the same class and subclass, namely, class 073, subclass 152.27. Thus, every claim of Groups IA and IB, sought to be restricted by the Examiner, are classified as belonging to this same class and subclass.

Applicants believe that the restriction required by the Examiner of Groups IA and IB is improper. Claims IA and IB are both dependent claims, not independent claims, and therefore each claim includes all of the limitations of its associated independent claim. Thus, each claim of the invention of group IB, as claimed, does not have the separate utility suggested by the Examiner. Moreover, the two groups of claims simply define alternative embodiments of the step "detecting the occurrence of a break in the mud cake seal", of the invention of related independent claim 1. The rules for this situation are described in 37 CFR 1.141(a):

"Two or more independent and distinct inventions may not be claimed in one national application, except that more than one species of an invention, not to exceed a reasonable number, may be specifically claimed in different claims in one national application, provided the application also includes an allowable claim generic to all the claimed species and all the claims to species in excess of one are written in dependent form (§1.75) or otherwise include all the limitations of the generic claim."

Three species of an invention do not "exceed a reasonable number". Therefore, the claims of Groups IA and IB may be specifically claimed in different claims in the present application.

**G) Applicant's Reply to Restriction between Groups IA and IC**

The arguments applied to the claims of Groups IA and IB also apply to the claims of Groups IA and IC. Therefore, the claims of Groups IA and IC may be specifically claimed in different claims in the present application.



**H) Applicant's Reply to Restriction between Groups IB and IC**

The arguments applied to the claims of Groups IA and IB also apply to the claims of Groups IB and IC. Therefore, the claims of Groups IB and IC may be specifically claimed in different claims in the present application.

**I) Applicant's Reply to Restriction between Groups IIA and IIB**

Applicants note that all of claims 1-23 are classified as belonging to the same class and subclass, namely, class 073, subclass 152.27. Thus, every claim of Groups IIA and IIB, sought to be restricted by the Examiner, are classified as belonging to this same class and subclass.

Applicants believe that the restriction required by the Examiner of Groups IIA and IIB is improper. Claims IIA and IIB are both dependent claims, not independent claims, and therefore each claim includes all of the limitations of its associated independent claim. Thus, each claim of the invention of group IB, as claimed, does not have the separate utility suggested by the Examiner. Moreover, the two groups of claims simply define alternative embodiments of "means for detecting the occurrence of a break in the mud cake seal", of the invention of related independent claim 12, currently amended. The rules for this situation are described in 37 CFR 1.141(a):

"Two or more independent and distinct inventions may not be claimed in one national application, except that more than one species of an invention, not to exceed a reasonable number, may be specifically claimed in different claims in one national application, provided the application also includes an allowable claim generic to all the claimed species and all the claims to species in excess of one are written in dependent form (§1.75) or otherwise include all the limitations of the generic claim."

Three species of an invention do not "exceed a reasonable number". Therefore, the claims of Groups IIA and IIB may be specifically claimed in different claims in the present application.

**J) Applicant's Reply to Restriction between Groups IIA and IIC**

The arguments applied to the claims of Groups IA and IB also apply to the claims of Groups IIA and IIC. Therefore, the claims of Groups IIA and IIC may be specifically claimed in different claims in the present application.

**K) Applicant's Reply to Restriction between Groups IIB and IIC**

The arguments applied to the claims of Groups IA and IB also apply to the claims of Groups IIA and IIC. Therefore, the claims of Groups IIA and IIC may be specifically claimed in different claims in the present application.

The Examiner, during the Examiner Interview on September 8, 2004, requested an electronic copy of the list of numbers of the patents disclosed in the Information Disclosure Statement. An electronic copy of this list was sent to the Examiner by email (david.rogers@uspto.gov) on September 16, 2004.